EXHIBIT “C”

INVESTIGATION, RESEARCH AND TESTING
Since 1970

50TH ANNIVERSARY
1970 – 2020

Ishynique McCoy v. T-Mobile Store, et al.
Electrical Evaluation

FedEx Supply Chain
Loss Location: Philadelphia, Pennsylvania

Date of Incident: July 17, 2016

Prepared for:

Robert W. Stanko, Esquire
Marshall, Dennehey, Warner, Coleman & Goggin, PC
2000 Market Street, Suite 2300
Philadelphia, Pennsylvania 19103

Case No. 2:18-CV-04079-AB

S-E-A Matter No. 06.104074

Issue Date: October 29, 2021

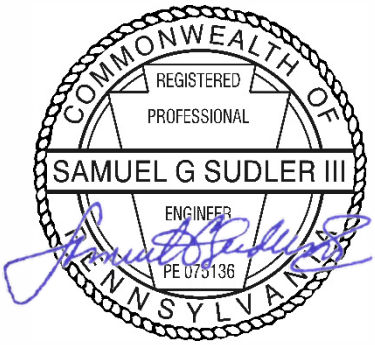

Table of Contents

List of Figures

Acronyms, Abbreviations and Definitions

NFPA	National Fire Protection Association
UL	Underwriters Laboratories
IEEE	Institute of Electrical and Electronics Engineers
ANSI	American National Standards Institute
IEC	International Electrotechnical Commission
VDC	Volts Direct Current
ADC	Ampere Direct Current
ICS	International Classification Standards
IMEI	International Mobile Equipment Identity
C.T.	Computer Tomography
JISC	Japanese Industrial Standards Committee
S.O.C	State of Charge
OEM	Original Equipment Manufacturer
USB	Universal Serial Bus
NSI	North Star Imaging
FMEA	Failure Mode and Effect Analysis

I. Executive Summary

Matter Assignment

On April 23, 2020, Marshall, Dennehey, Warner, Coleman & Goggin, PC requested SEA, Ltd. (S-E-A) to conduct an electrical evaluation and investigation associated with the injury of Ms. Ishynique McCoy that occurred on July 17, 2016 in Philadelphia, Pennsylvania. The investigation was assigned to S-E-A Senior Project Engineer Samuel G. Sudler III, P.E., IntPE, DFE, C.F.E.I., C.V.F.I. as S-E-A Matter No. 06.104074. Robert W. Stanko, Esquire of Marshall, Dennehey, Warner, Coleman & Goggin, PC represents the interests of FedEx Supply Chain.

Scope

Specifically, S-E-A was requested to conduct an electrical evaluation and investigation to determine, if possible, what caused the event that led to the injury of Ms. Ishynique McCoy.

Methodology

The methodology utilized by S-E-A during the investigation of this incident was in accordance with *The Scientific Method* and applicable principles. The investigation and analysis of any incident is a complex and scientific endeavor. The methodology of such an endeavor, therefore, must include the comprehensive, objective, and accurate compilation and analysis of the available data.

Conclusions

- **Based on an examination of the subject Apple iPhone 6 Plus cellular phone and battery remains, a detailed analysis of the X-Ray images, C.T. Scan data of the subject Apple iPhone 6 Plus cellular phone and battery remains, reference material, various standards and information obtained during this investigation, it is the opinion of S-E-A that the subject battery cell located in the subject Apple iPhone 6 Plus cellular phone was subjected to external damage, unrelated to work performed on the Apple iPhone 6 Plus cellular phone and battery cell, that caused an electrical failure with the battery cell resulting in the injury to Ms. McCoy.**

Signatures

S-E-A and the undersigned hereby certify that the opinions and conclusions expressed herein are based upon the application of reliable principles and scientific methodologies to all of the facts known by S-E-A and the undersigned when this report was issued, as well as knowledge, skill, experience, training and/or education. Should additional information be discovered, S-E-A and the undersigned reserve the right to appropriately amend or augment these findings.

Prepared By:

Samuel G. Sudler III, P.E., IntPE, DFE, C.F.E.I.
Senior Project Engineer
Commonwealth of Pennsylvania
License No. PE075136

Technically Reviewed By:

Robert S. House

II. Procedures

1. On August 20, 2020, a joint non-destructive virtual evidence examination was conducted at the Safety Engineering Laboratories facility located at 27803 College Park Drive in Warren, Michigan, in which S-E-A Senior Project Engineer Samuel G. Sudler III, P.E., IntPE, DFE, C.F.E.I. attended on behalf of FedEx Supply Chain and other interested parties attended at which time the following investigative tasks were performed:
   - The artifacts retained from the event were examined, photographed, X-Rayed and C.T. scans of the remains of the subject Apple iPhone 6 Plus were taken and subsequently provided to all parties.
2. On July 7, 2021, a joint evidence examination of the subject Apple iPhone 6 Plus cellular phone and the battery cell was conducted at the Micron Analytical Laboratory facility located at 3815 Lancaster Pike in Wilmington, Delaware. The examination was conducted by S-E-A Senior Project Engineer Samuel G. Sudler III, P.E., IntPE, DFE, C.F.E.I. on behalf of FedEx Supply Chain, with other interest parties attending in person as well as via Zoom, at which time the following investigative tasks were performed:
   - The subject Apple iPhone 6 Plus cellular phone and battery cell. The items were examined in detail and documented with photographs as well as notes.
   - Microscopic images, and X-Rays, of the Apple iPhone 6 Plus cellular phone and battery cell were taken and distributed to all interested parties.
3. Prior to the issuance of this report, various materials were researched, obtained and/or reviewed, including but not limited to the following:
   - Discovery material provided by Marshall, Dennehey, Warner, Coleman & Goggin, PC
   - UL 1642 Safety Standard for “Lithium Batteries”
   - UL 60950-1 Safety Standard for Information Technology Equipment - Safety - Part 1: General Requirements
   - UL 2054 Safety Standard for “Household and Commercial Batteries”
   - IEC 62133-2 Secondary cells and batteries containing alkaline and other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications - Part 2: Lithium Systems
   - Japanese Industrial Standard (JIS) C 8714: 2007 - Safety tests for portable Lithium-ion secondary cells and batteries for use in portable electronic applications

- National Fire Protection Association (NFPA) 921, “Guide for Fire and Explosion Investigations,” 2014 and 2017 Editions
- Institute of Electrical and Electronics Engineers (IEEE) 1584™-2002 – IEEE Guide for Performing Arc Flash Hazard Calculations
- Kirk’s Fire Investigation, Sixth Edition, by John D. DeHaan
- Ignition Handbook, by Vytenis Babraukas
- Handbook of Batteries, Fourth Edition, by David Linden and Thomas B. Reddy
- Battery Technology Handbook, Second Edition, Edited by H.A. Kiehne
- Lithium-ion Batteries – Fundamentals and Applications, Edited by Yuping Wu
- Lithium-Ion Batteries Hazard and Use Assessment (Springer Briefs in Fire), Celina Mikolajczak, Michael Kahn, Kevin White and Richard Thomas Long
- Lithium-ion Rechargeable Batteries -Technical Handbook by Sony Electronics
- "Safe Lithium-Ion Battery Designs for Use, Transportation and Second Use," by Judy Jeevarajan, Ph.D.
- “Safety mechanisms in lithium-ion batteries,” by P.G. Balakrishnan, R. Ramesh, T. Prem Kumar in Journal of Power Sources, 155 (2006) 401-414
- “Thermal runaway caused fire and explosion of lithium-ion battery,” by Qingsong Wang, Ping Ping, Xuejuan Zhao, Guanquan Chu, Jinhua Sun, Chunhua Chen in Journal of Power Sources, 208 (2012) 210-224
- "Less Fire, More Power: The Secret to Safer Lithium-Ion Batteries," Weiyang Li and Yi Cui, in IEEE Spectrum, August 23, 2018
- William J. Meese and Robert W. Beausoliel, “Exploratory Study of Glowing Electrical Connections” National Bureau of Standards (NBS) Building Science Series 103, October 1977
- Bruce V. Ettling, "Glowing Connections" Fire Technology 18, No. 4 (1982): 344-349

III. Discussion

Background

According to the third-party complaint filed by Cwork, on or about December 9, 2015, Ms. Ishynique McCoy's Apple iPhone 6 Plus was shipped to CWork for repair. The phone was then shipped to GENCO d/b/a FedEx Supply Chain on December 21, 2015. The Apple iPhone 6 Plus was then received by CWork from GENCO on February 3, 2016. Twenty-two days later CWork shipped the Apple iPhone 6 Plus back to Ms. McCoy on February 25, 2016. From February 3, 2016, until July 16, 2016, there were no reported issues with the Apple iPhone 6 Plus cellular phone from either CWork or Ms. McCoy.

According to the Responses to the Third-Party Defendant, ATC Logistics & Electronics, FedEx Supply Chain received the subject phone on December 30, 2015, performed certain services on January 18, 2016, and shipped the phone back to CWork on January 22, 2016.

According to the complaint, on or about July 17, 2016, Ms. McCoy had her Apple iPhone 6 Plus cellular phone in her back pocket when the phone allegedly exploded in her pocket injuring Ms. McCoy. The artifacts removed from the McCoy incident were retained by Bernhardt, Rothermel & Siegel, P.C. in Philadelphia, Pennsylvania.

Laboratory Examination

Following the August 20, 2020 virtual joint examination, a joint laboratory examination of the retained artifacts was conducted on July 7, 2021 at Micron Analytical Laboratory located in Wilmington, Delaware, by S-E-A Senior Project Engineer Samuel G. Sudler, III, P.E., IntPE, DFE, C.F.E.I. on behalf of FedEx Supply Chain and other interest parties. The examination was conducted to determine if any of the artifacts exhibited evidence of a failure capable of being the cause of the subject incident.

The artifacts (as shown in **Figure 1**) were examined in detail and consisted solely of the Apple iPhone 6 Plus cellular phone from the McCoy incident indecent.

Figure 1: Artifacts retained form the McCoy incident.

Examination of the artifacts began with the top side of the Apple iPhone, Model No. A1522 with an IMEI No. 354387062506228, identifying the phone as an Apple iPhone 6 Plus. Examination of the rear of the phone revealed no visible damage to the phone or the front camera, as seen in **Figure 2** and **Figure 3**. Examination of the front of the phone revealed damage to the screen that appeared to be cracked and a gap between the front and rear as seen in **Figure 4** and **Figure 5**. The examination of the phone then continued with the interior to expose the battery cell as well as all the connection points associated with items that were replaced by FedEx Supply Chain, which were as follows:

- The battery
- The back cover
- The front camera
- The LCD
- The charging port

Figure 2: Rear of the subject Apple iPhone 6 Plus.

Figure 3: Closeup of the Apple iPhone information.

Figure 4: Front of the subject Apple iPhone 6 Plus.

Figure 5: Side view of the Apple iPhone 6 Plus.

Examination of the X-Ray image for the Apple iPhone 6 Plus did not reveal evidence of an electrical malfunction associated with any of the electrical or electronic components associated with the Apple iPhone 6Plus, as seen in **Figure 6** and **Figure 7**. Close examination of the home button as well as the charging port did not reveal evidence of an electrical malfunction or failure. In addition, the interior of the subject Apple iPhone 6 Plus with the cables exposed also revealed no evidence of melting or damage, as seen in **Figure 8**. Close examination of these items as well as the X-Ray images revealed the only damage to the phone was in the screen area, away from all of the electrical and electronic components of the phone.

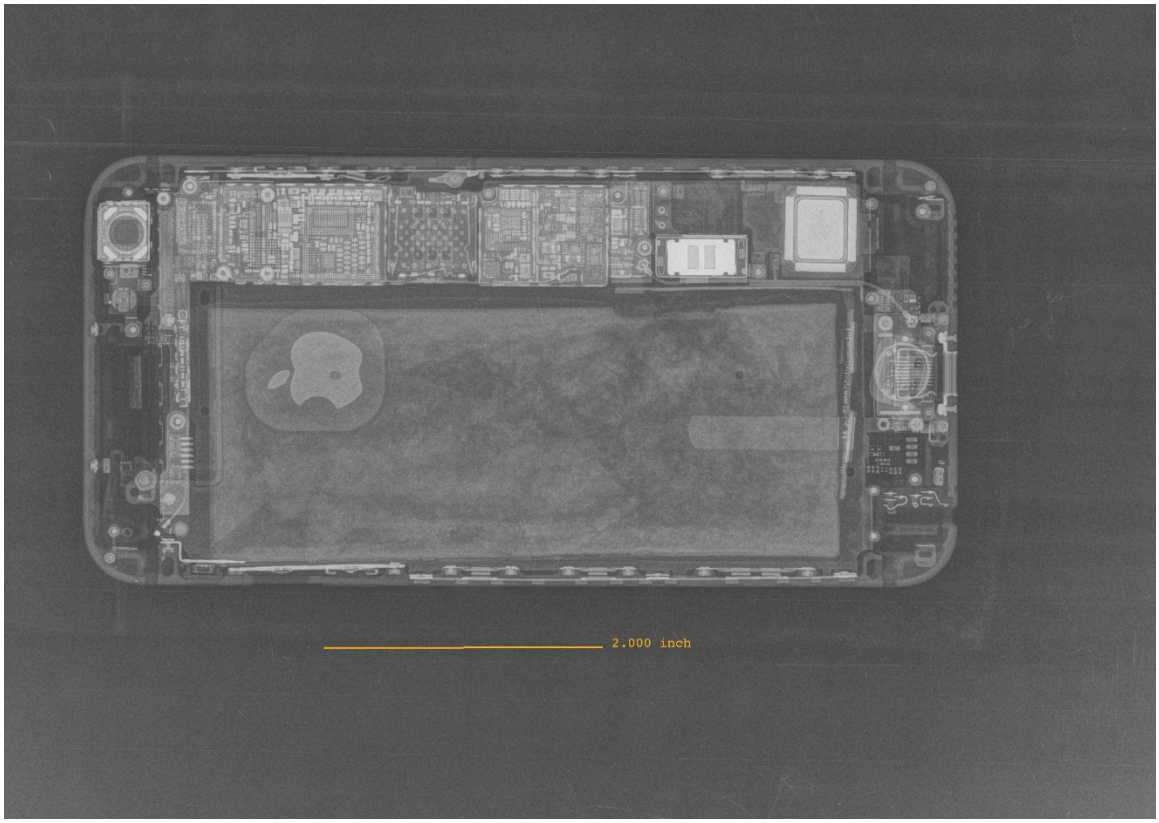

Figure 6: X-Ray image of the subject Apple iPhone 6 Plus.

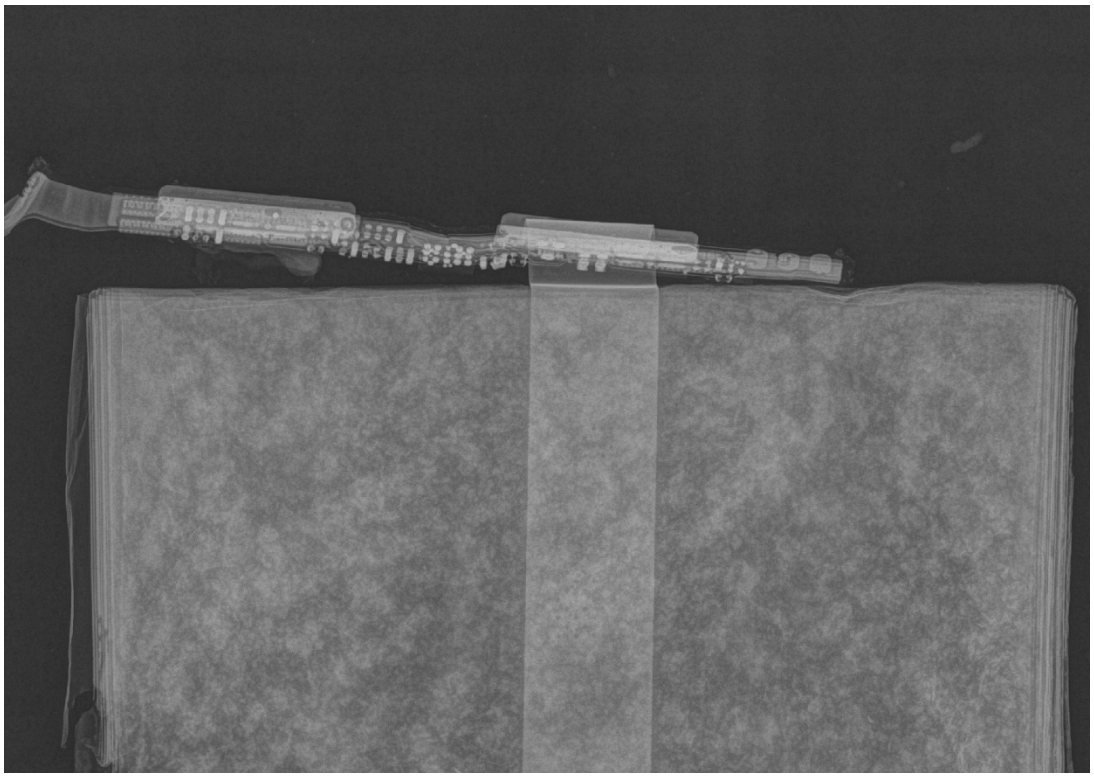

Figure 7: X-Ray image of the subject battery cell.

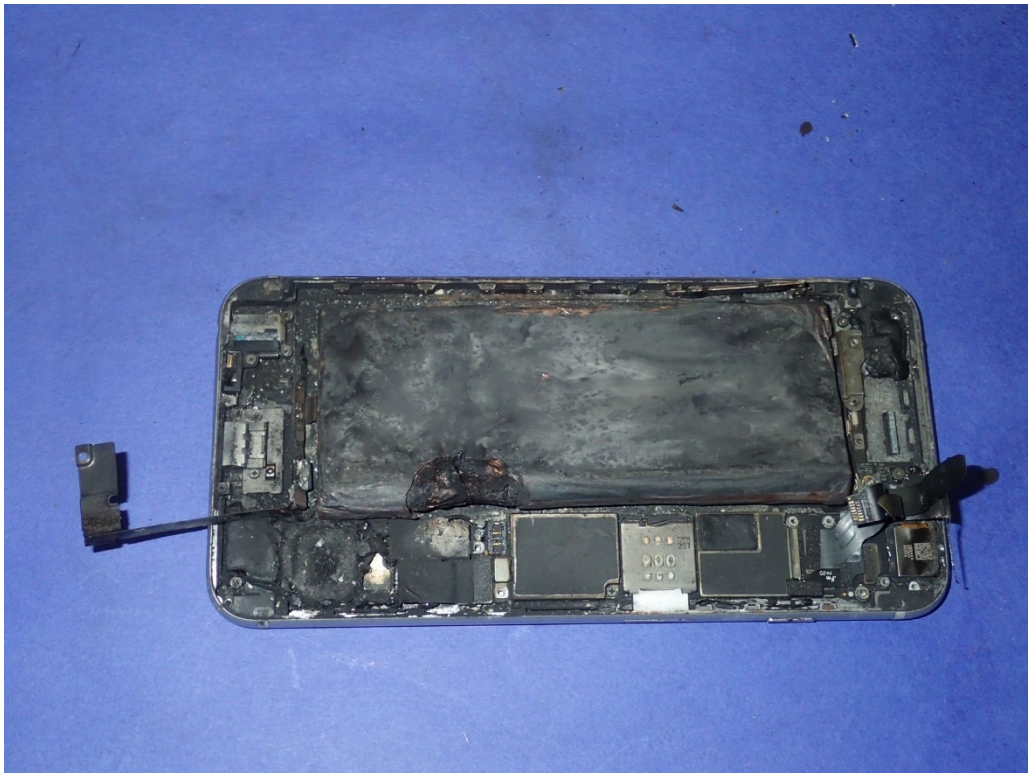

Figure 8: Interior of the subject Apple iPhone 6 Plus revealing no damage to the plastic cables.

Examination of the interior of the Apple iPhone 6 Plus for the LCD screen did show physical damage away from the electrical and electronic components, as shown in **Figure 9** and **Figure 10**. Close examination of the X-Ray images revealed it was over 25mm from the top or side of the electronic components, as seen in **Figure 11**. Close examination of the subject Apple iPhone 6 Plus revealed there was an unidentified loose screw in the phone by the SIM card slot. Examination of the screw utilizing a stereo microscope revealed there was no visible damage to the screw in the form of melted metal that would have occurred if the screw had caused the damage, as seen in **Figure 12** and **Figure 13**.

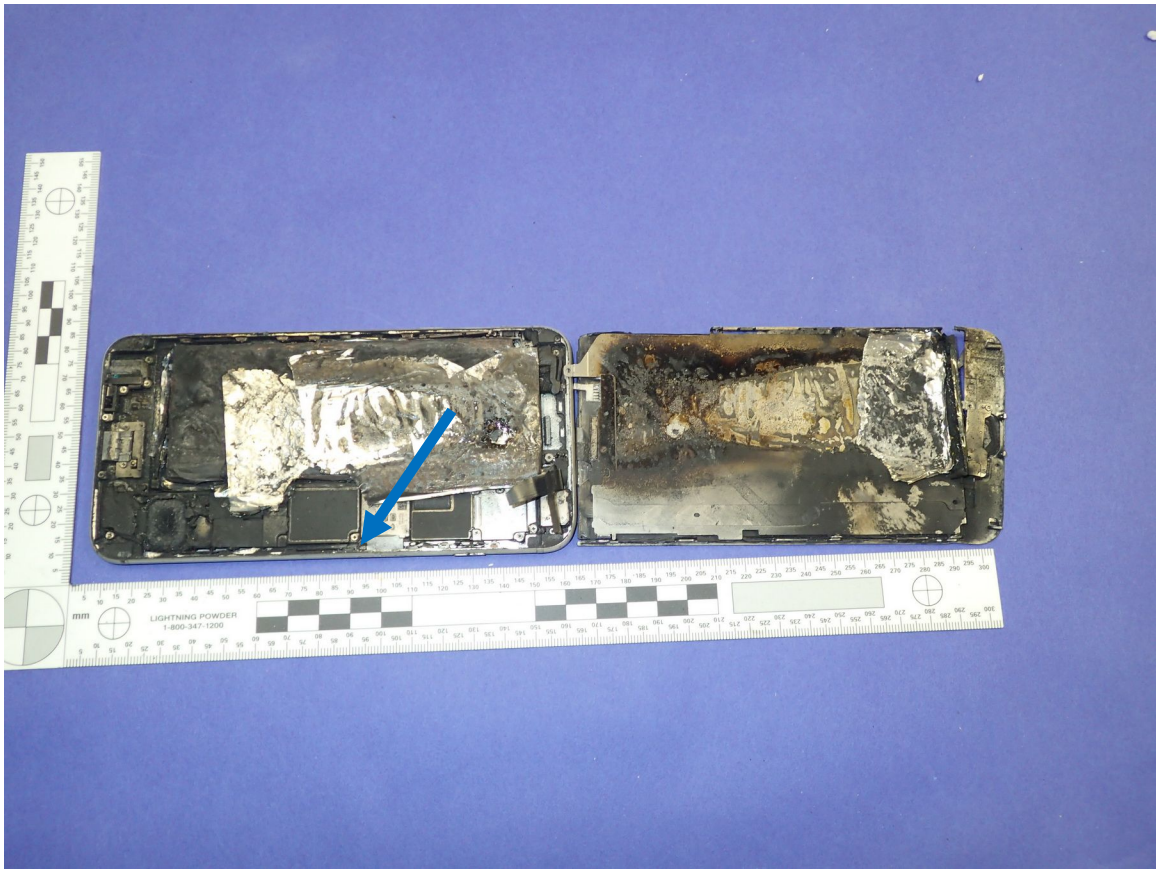

Figure 9: Remains of the subject Apple iPhone showing the main electrical control system (on left) and the LCD screen (on the right), and location of loose screw (Blue Arrow).

Figure 10: Closeup of damage in the form of a hole (Green Arrow).

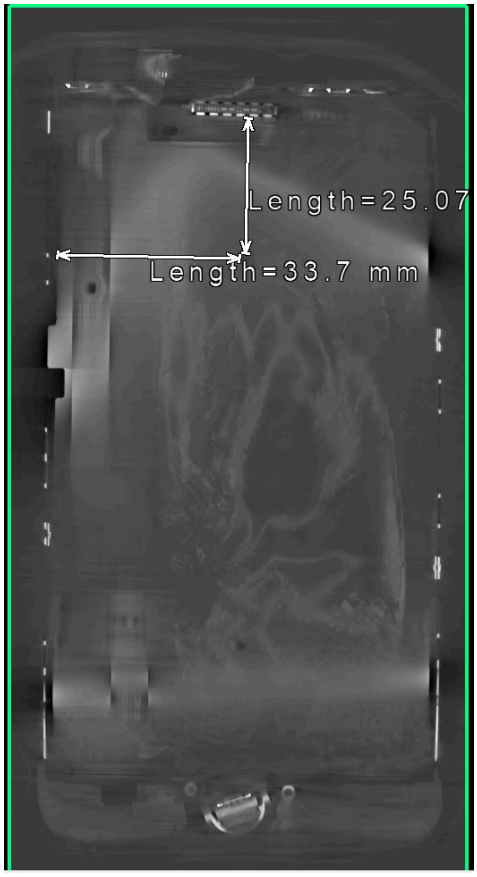

Figure 11: X-Ray with measurement of distance from electrical components and the damage at the hole.

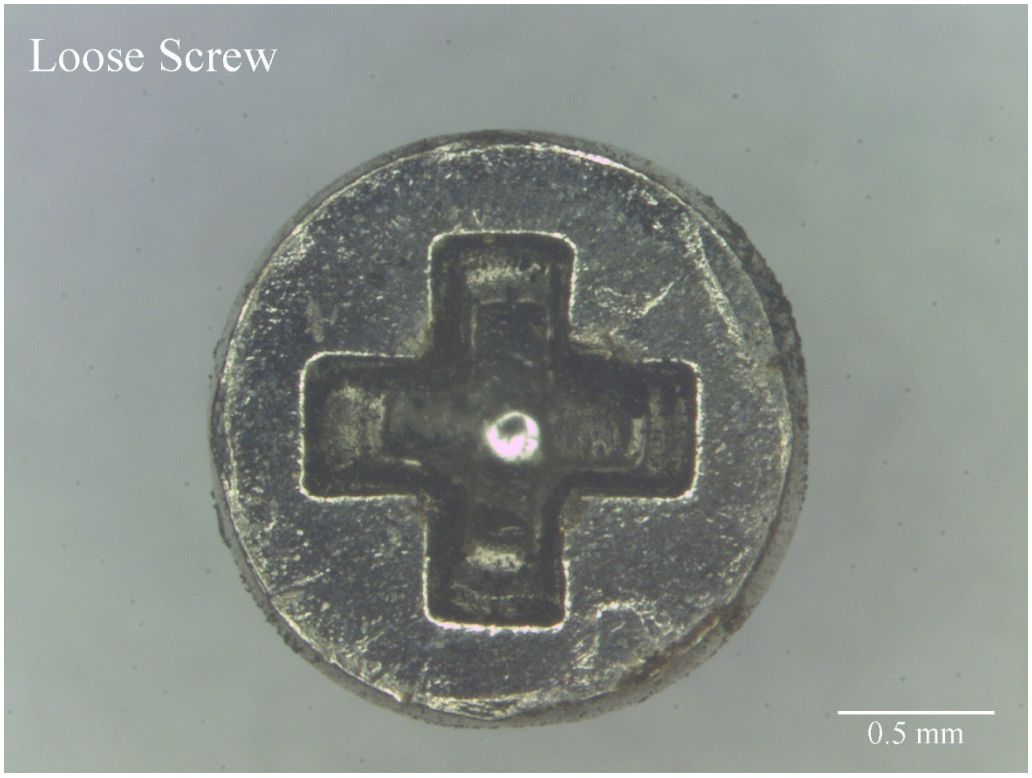

Figure 12: Top of the Loose screw found near SIM card slot.

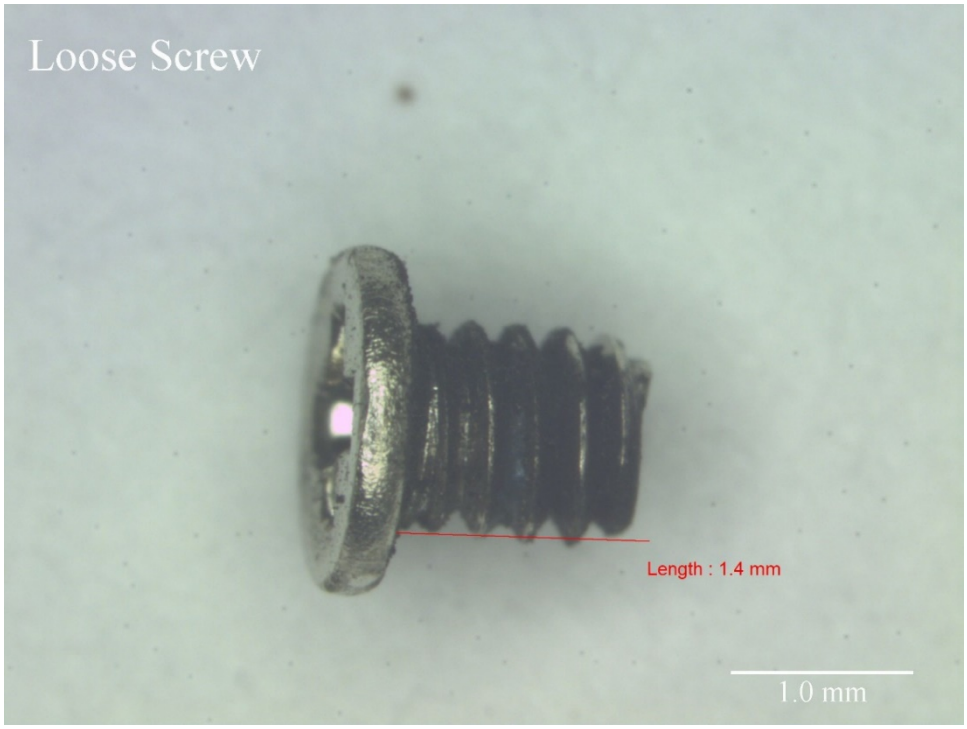

Figure 13: Side view of the Loose screw found near SIM card slot.

Therefore, it is the opinion of S-E-A that the subject battery cell located in the subject Apple iPhone 6 Plus cellular phone was subjected to external damage, unrelated to work performed on the Apple iPhone 6 Plus cellular phone and battery cell, that caused an electrical failure with the battery cell resulting in the injury to Ms. McCoy.

Appendices

Samuel G. Sudler III, P.E., IntPE, DFE, C.F.E.I. Credentials

1. Samuel G. Sudler III, P.E., IntPE, DFE, C.F.E.I. CV
2. Samuel G. Sudler III, P.E., IntPE, DFE, F.NSPE, C.F.E.I. Billable Rate Disclosure
3. Samuel G. Sudler III, P.E., IntPE, DFE, F.NSPE, C.F.E.I. Testimony Log

List of Referenced Material

1. American National Standards Institute (ANSI)/National Fire Protection Association (NFPA) 70E – Standard for Electrical Safety Requirements for Employee Workplaces, 2015 Edition
2. UL 1642 Safety Standard for "Lithium Batteries"
3. UL 2054 Safety Standard for "Household and Commercial Batteries"
4. International Classification Standard (ICS) 29.220.01 – National Standard of the People's Republic of China – GB/T 18287-2000 – General specification of lithium-ion battery for cellular phone
5. ICS 29.220.01 – National Standard of the People's Republic of China – GB/T 18287-2013 General specification of lithium-ion cells and batteries for mobile phone.
6. IEC 62133-2 Secondary cells and batteries containing alkaline and other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications - Part 2: Lithium Systems
7. Japanese Industrial Standard (JIS) C 8714: 2007 - Safety tests for portable Lithium-ion secondary cells and batteries for use in portable electronic applications
8. Universal Serial Bus (USB) Specification, Revision 2.0, April 27, 2000
9. National Fire Protection Association (NFPA) 921, "Guide for Fire and Explosion Investigations," 2014 and 2017 Editions